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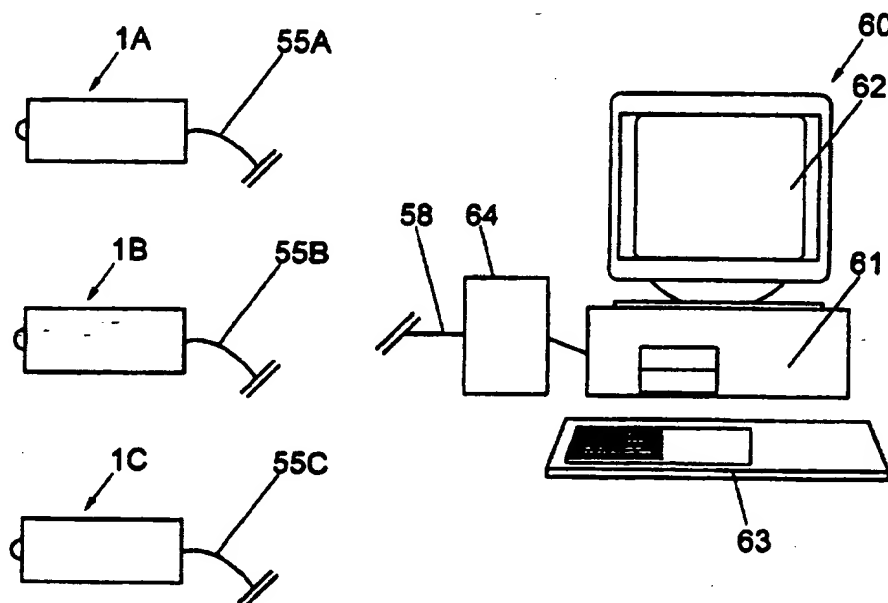
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(54) Title: IMAGING SYSTEM



## (57) Abstract

A front end unit (1) for use in an imaging system comprises a camera (10) to provide an image, a digitiser (20) to convert the image into digital data, a data processor (30) for manipulation and/or storage of the digitised image, and a modem (40) for rendering the digitised image suitable for transmission by telephone network. The camera, digitiser and data processor, and preferably the modem, are provided within a single housing (5). The elements are dedicated, enabling the housing to be made small. The unit is preferably suitable for connection direct to a telephone socket. A system including a remote host computer for receiving images from one or more front end units is also provided.

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1     **IMAGING SYSTEM**

2

3     The present invention relates to an imaging system and  
4     especially to an imaging system including the  
5     transmission of images via a telephone network.

6

7     The transmission of digitised information which  
8     represents images, via a telephone network, is known  
9     and is commonly performed. Such transmission typically  
10    involves a first sophisticated computer, equipped with  
11    a modem, at a first end of a telephone line and a  
12    second sophisticated computer equipped with a modem, at  
13    a second end of the telephone line. Where the aim is  
14    to capture images in the vicinity of the first  
15    computer, a video camera is typically connected to the  
16    first computer and data representing images captured by  
17    the camera are transmitted via the telephone line to  
18    the second computer. Systems are known in which  
19    several cameras may be connected to the first computer  
20    which may then transmit, via a modem, data representing  
21    images from one or more of the cameras, to the second  
22    computer. In such systems additional hardware such as  
23    multiplex units may be required for use with the first  
24    computer.

25

1 According to a first aspect of the present invention  
2 there is provided a front end unit for use in an  
3 imaging system said front end unit comprising: camera  
4 means to provide an image; digitisation means to  
5 convert said image into digital data; data processing  
6 means; modem means for rendering said digital data  
7 suitable for transmission by telephone network, wherein  
8 said camera means, said digitisation means and said  
9 data processing means are provided within a single  
10 housing.

11

12 Preferably, said modem means is also provided within  
13 said single housing.

14

15 Preferably, said digitisation means is dedicated for  
16 use in said front end unit.

17

18 Preferably, said data processing means is dedicated for  
19 use in said front end unit.

20

21 Preferably, said modem means is dedicated for use in  
22 said front end unit.

23

24 Preferably, the camera means comprises a video camera.

25

26 Preferably, the front end unit includes data  
27 compression means.

28

29 Preferably, the modem means comprises a modem for use  
30 with ISDN, PSTN or network telecommunications systems.

31

32 Preferably, the front end unit includes a transmitter  
33 for connection to a cellular telephone system or other  
34 wireless telegraphy system.

35

36 Preferably, the data processing means includes a frame

1 grabber.

2

3 Preferably, the housing is not greater than about 15cm  
4 by 15cm by 25cm in size.

5

6 Preferably, the front end unit includes two spaced  
7 apart camera means each adapted to provide an image  
8 from a slightly different view point, enabling a three  
9 dimensional interpretation of the data provided by said  
10 front end unit.

11

12 Preferably, the front end unit includes input means for  
13 receipt of an image signal from a second or subsequent  
14 front end unit, and at least one of the digitisation  
15 means, data processing means and modem means acts upon  
16 the image signal from the second or subsequent front  
17 end unit.

18

19 According to a further aspect of the present invention  
20 there is provided an imaging system including at least  
21 one front end unit in accordance with the first aspect.

22

23 Preferably, the imaging system further includes a host  
24 unit comprising a computer and a modem, said host unit  
25 being located remote from said front end unit and  
26 adapted to communicate with the front end unit via a  
27 telephone connection.

28

29 Preferably, said host unit includes display means and  
30 is adapted for displaying images communicated from the  
31 front end unit.

32

33 Preferably, the host unit includes data storage means  
34 for storing data relating to images communicated from  
35 the front end unit.

36

1 Preferably, the host unit includes means for  
2 manipulating or analysing images.

3

4 Preferably, the host unit includes means for  
5 selectively interrogating one of a number of front end  
6 units by communicating with said selected front end  
7 unit via a corresponding selected telephone connection.

8

9 Preferably, the front end unit is adapted to initiate  
10 communication with the host unit in response to a  
11 triggering signal, or alarm signal, generated in  
12 response to a stimulus in the vicinity of the front end  
13 unit.

14

15 Preferably, the imaging system comprises:

16 a first front end unit in accordance with the  
17 first aspect of the present invention, the first front  
18 end unit including input means for receipt of an image  
19 signal from a second or subsequent front end unit;

20 at least one second or subsequent front end unit,  
21 in the vicinity of the first front end unit, without at  
22 least one of a digitisation means, data processing  
23 means or modem means, and wherein the system is adapted  
24 to relay images from the second or subsequent front end  
25 unit to the host unit by utilising the digitisation  
26 means, data processing means and/or modem means of the  
27 first front end unit.

28

29 According to a further aspect of the present invention,  
30 there is provided a method of stock control including:  
31 use of a plurality of spaced apart front end units in  
32 order to provide images from which stock levels in  
33 corresponding spaced apart areas can be determined.

34

35 The method of stock control may further comprise use of  
36 a remote host unit to selectively interrogate a first

1 one of said plurality of front end units and to receive  
2 one or more images from said selected front end unit  
3 from which the stock level at the corresponding area  
4 may be determined.

5  
6 The method may further comprise using the host unit to  
7 subsequently interrogate a second one of said plurality  
8 of front end units and to receive one or more images  
9 therefrom.

10  
11 Preferably, the host unit runs stock control/ordering  
12 software simultaneously with software enabling the  
13 interrogation of the front end units and interpretation  
14 of data received from said front end units.

15  
16 Preferably, the use of the host unit to interrogate a  
17 selected front end unit comprises the host unit  
18 initiating connection to the front end unit by  
19 selection of a telephone connection which corresponds  
20 to the selected front end unit.

21  
22 Embodiments of the present invention will be described,  
23 by way of example, with reference to the accompanying  
24 drawings in which:

25  
26 Fig. 1a is a schematic illustration of an embodiment of  
27 a front end unit for use in an imaging system in  
28 accordance with the present invention;

29  
30 Fig. 1b is a front view of the front end unit of Fig.  
31 1a;

32  
33 Fig. 2 is a schematic illustration of an imaging system  
34 showing three mutually remote front end units and one  
35 host unit.

36

1 Fig. 3 is a schematic illustration of an alternative  
2 embodiment, showing four camera units in the same  
3 vicinity with shared data processing means and modem in  
4 the same housing as one of the cameras;

5

6 Fig. 4a is a schematic illustration of an embodiment of  
7 a front end unit having two adjacent cameras;

8

9 Fig. 4b is a front view of the front end unit of Fig.  
10 4a; and

11

12 Figs. 5 and 6 provide technical details of embodiments  
13 of front end units in accordance with the present  
14 invention.

15

16 With reference to Figs. 1a and 1b a front end unit 1,  
17 for use in an imaging system, comprises camera means in  
18 the form of a compact high-resolution colour video  
19 camera 10, digitisation means 20 for digitising the  
20 image provided by said video camera 10, data processing  
21 means 30 and modem means in the form of a dedicated  
22 modem 40, all housed in a compact housing 5. The  
23 housing 5 is provided with a first aperture 6 at a  
24 first end thereof through which light may reach a lens  
25 12 of the video camera 10. The housing 5 is provided  
26 with a second aperture at the second end thereof which  
27 allows access to a socket 50 suitable for connection to  
28 a telephone line.

29

30 The use of dedicated digitisation means 20, data  
31 processing means 30 and modem 40 enables these  
32 components to be constructed such that they are  
33 extremely economical to produce and small in size. A  
34 compact camera 10 is also used enabling the size of the  
35 front end unit to be restricted to approximately the  
36 same size as a conventional video camera.



1 Fig. 2 illustrates an imaging system having first,  
2 second and third remotely located front end units 1A,  
3 1B, 1C. The front end units 1A, 1B, 1C may be in  
4 different cities or different countries and each is  
5 connected to a respective telephone line 55A, 55B, 55C  
6 via which connection to a telephone network can be  
7 achieved. The system also includes a host unit,  
8 generally designated 60 comprising a host computer 61  
9 having output means, for example in the form of a  
10 display screen 62, input means, for example in the form  
11 of a keyboard 63 and modem means 64 connected to a  
12 telephone line 58 via which connection to a telephone  
13 network can be achieved. The host unit 60 can be used  
14 to interrogate any of the front end units 1A, 1B, 1C  
15 via the telephone network merely by accessing the  
16 telephone line 55A, 55B, 55C corresponding to the  
17 desired front end unit 1A, 1B, 1C. Typically,  
18 therefore the host unit will have a database of  
19 telephone numbers, each corresponding to a different  
20 front end unit. The host unit 60 can be used to  
21 manipulate the images received, for example enlarging  
22 selected parts of said images.

23  
24 The interrogation by the host unit may be high level as  
25 commands sent by the host unit can be interpreted by  
26 the respective data processing means 30 in each front-  
27 end unit. The functions of the front end unit may thus  
28 be controlled by the host unit, and the host unit may  
29 also control front end mechanical devices (not shown),  
30 such as means for selectively orienting or adjusting  
31 the position of said front end unit.

32  
33 It will be appreciated that the front end units 1A, 1B,  
34 1C may be arbitrarily remote from each other and from  
35 the host unit 60 provided that the host unit 60 and the  
36 front end units 1A, 1B, 1C are connectable to a

1 telephone network. In a variation of this embodiment  
2 one or more of the host unit and front end units may  
3 include transmission means for wireless telegraphy of a  
4 signal (such as is known from cellular telephone  
5 technology) and may thus operate, and transmit or  
6 receive images, in locations where no hard wired  
7 telephone lines (or other image transmission lines)  
8 exist.

9  
10 Each unit also requires a source of electrical power  
11 (not shown) and this will normally comprise connection  
12 to electrical mains. However, portable or stand alone  
13 electrical power sources could be used, for example  
14 batteries or electricity generating means. Thus one or  
15 more front end units may be fully portable. The host  
16 unit, for example in the form of a lap-top computer  
17 connected to a cellular telephone network, may also be  
18 fully portable. A fully portable host unit may be of  
19 particular value in enabling mobile emergency services  
20 to view a remote target area, such as the scene of a  
21 fire or crime, while travelling to said area.

22  
23 The embodiment illustrated in Fig. 2 provides an  
24 economical way of providing video images from  
25 arbitrarily spaced apart areas to a host unit user.  
26 Furthermore, the front end units being small and self  
27 contained (except perhaps for power and telephone  
28 connection lines) are easy to position, unobtrusive,  
29 non-invasive, robust and interference-resistant.

30  
31 An envisaged use for such a system is for stock control  
32 in the circumstances where a supplier is responsible  
33 for maintaining stocks of his product in a number of  
34 retail establishments. One or more front end units  
35 would be provided in the stock storage area of each  
36 retail establishment and positioned so that the images

1 provided show the level of stock of the supplier's  
2 product in each establishment. The supplier can then  
3 check the level of stock in each location from a remote  
4 host unit. Stock control and ordering software could  
5 be run on the host unit simultaneously with imaging  
6 software and a user can therefore view the retailer  
7 details, ideal stock levels etc as well as the image  
8 showing the actual stock levels and, if required,  
9 immediately requisition further stock. This system is  
10 much more efficient than a system requiring travel to,  
11 and manual inspection of stock at, each retail outlet.  
12 The enhanced efficiency would enable rapid recovery of  
13 the capital expenditure involved in installing such a  
14 system.

15  
16 Embodiments of systems in accordance with the present  
17 invention may be beneficially used in applications  
18 other than stock control, and there are many  
19 applications in which it is desirable to access visual  
20 images from remote locations. Applications include:  
21 monitoring of industrial processes, for example in oil  
22 and gas production; industrial line inspection;  
23 security surveillance; fire monitoring; traffic and  
24 motorway surveillance; automated telling machine  
25 surveillance; customer monitoring; vision control and  
26 personal property monitoring. The host unit may  
27 display images enabling a user to inspect the images  
28 and decide on and initiate an appropriate course of  
29 action. Alternatively, the host unit may run software  
30 to enable automatic analysis of the images and  
31 initiation of data logging or action to be taken. For  
32 example a system having a suitably positioned front end  
33 unit could be used to automatically recognise and log  
34 the registration details of all vehicles entering or  
35 leaving a given area.

36

1 A variation of an embodiment of a system in accordance  
2 with the present invention includes front end units  
3 which, rather than waiting to be interrogated by the  
4 host unit, initiate communication with the host unit  
5 and transmission of images in response to a stimulus in  
6 the vicinity of the front end unit. The stimulus may  
7 be provided by, for example, a burglar alarm system, a  
8 fire detection system, motion detection system etc.  
9 The alarm or other means of providing stimulus could be  
10 external to the front end unit or included as part of  
11 the front end unit.

12  
13 A host unit may be provided with a number of telephone  
14 lines for simultaneous communication with a number of  
15 front end units. In this case the host system may use  
16 a split screen display to simultaneously display images  
17 from a number of front end units.

18  
19 There are applications in which a number of cameras are  
20 provided in close proximity. In such applications it  
21 is possible to provide a number of front end units each  
22 including a camera 10, digitisation means 20, data  
23 processing means 30 and a modem 40, and for some  
24 applications (such as where damage to front end units  
25 is likely) the high level of redundancy that this  
26 provides is desirable. In applications where such  
27 redundancy is not required a cost saving can be  
28 obtained by providing a number of front end units each  
29 of which include a camera but which have some shared  
30 components.

31  
32 Fig. 3 shows a first front end unit 101 including a  
33 camera 10, digitisation means 20, data processing means  
34 30 and a modem 40. The first front end unit also  
35 includes a plurality of input sockets 108 enabling  
36 connection to second and subsequent front end units,

1 shown in the illustrated embodiment as second, third  
2 and fourth front end units 101A, 101B, 101C. The  
3 second, third and fourth front end units 101A, 101B,  
4 101C each include a camera 110A, 110B, 110C,  
5 digitisation means 120A, 120B, 120C and output means  
6 125A, 125B, 125C for connection to the sockets 108 of  
7 the first front end unit. The second, third and fourth  
8 front end units 101A, 101B, 101C do not include data  
9 processing means or a modem but instead rely upon these  
10 elements of the first front end unit 101 for  
11 transmission of images to a host unit (not shown).

12  
13 Systems could include an arbitrary number of second and  
14 subsequent front end units which rely upon components  
15 housed in a first front end unit for image  
16 transmission. The second and subsequent front end  
17 units could be provided without digitisation means, in  
18 which case they would transmit analogue image signals  
19 to the first front end unit for digitisation by the  
20 digitisation means provided therein.

21  
22 Although in the above description the camera means,  
23 digitisation means, data processing means and modem  
24 means have been described, for convenience, as separate  
25 entities, it is of course possible for two or more of  
26 these elements to be in the form of a single component.  
27 For example, cameras which provide digital output could  
28 be provided.

29  
30 The data processing means may include a considerable  
31 data storage capacity. This allows, for example,  
32 storage of images taken over an extended period, for  
33 downloading to a host unit during a relatively short  
34 connection time. This enhances efficiency and allows  
35 pre-event images to be retrieved even if it is only  
36 decided that they are required after the event has

1 occurred. This is of particular value in a system in  
2 which transmission of images is triggered by an alarm  
3 (such as a fire alarm or security alarm) in the  
4 vicinity of the front end unit, as it allows access to  
5 images leading up to the event that triggered the  
6 alarm. A preferred embodiment therefore comprises a  
7 front end unit in which images are constantly written  
8 to memory. Stored images preferably include time, date  
9 and/or camera location information.

10  
11 Fig. 4a shows schematically a front end unit 401 having  
12 first and second video cameras 410A, 410B within a  
13 single housing 405. The front end unit 401 includes  
14 respective first and second digitisation means 420A,  
15 420B for the first and second video cameras 410A, 410B.  
16 The front end unit 401 also includes data processing  
17 means 430 and modem means 440 to enable connection to a  
18 telephone network. Fig. 4b shows a front view of the  
19 front end unit 401. The objective lenses 412A, 412B of  
20 the first and second video cameras 410A, 410B are  
21 spaced apart by a fixed distance and thus provide  
22 images from slightly different viewpoints. By using  
23 known techniques this enables construction of a three  
24 dimensional model of the images in the host unit (not  
25 shown).

26  
27 Figs. 5 and 6 provide details of technical data  
28 relating to preferred embodiments of a front end unit.

29  
30 Embodiments of the present invention provide a compact,  
31 economical front end unit suitable for connection  
32 direct to a telephone socket. This enables an imaging  
33 system, for transmission of images from a number of  
34 arbitrarily distant front end units to an arbitrarily  
35 distant host unit, to be provided extremely  
36 economically with a minimum of hard-wiring. A desired

1 front end unit can be interrogated merely by selecting  
2 a corresponding telephone number from the host unit.

3

4 Modifications and improvements may be incorporated  
5 without departing from the scope of the invention, and  
6 elements hereinbefore described could be replaced by  
7 functional equivalents thereof.

8

## 1 CLAIMS

2

3 1. A front end unit for use in an imaging system said  
4 front end unit comprising:

5 camera means to provide an image;

6 digitisation means to convert said image into  
7 digital data;

8 data processing means;

9 modem means for rendering said digital data  
10 suitable for transmission by telephone network, wherein  
11 said camera means, said digitisation means and said  
12 data processing means are provided within a single  
13 housing.

14

15 2. A front end unit according to Claim 1, wherein  
16 said modem means is also provided within said single  
17 housing.

18

19 3. A front end unit according to either preceding  
20 claim, wherein said digitisation means is dedicated for  
21 use in said front end unit.

22

23 4. A front end unit according to any preceding claim,  
24 wherein said data processing means is dedicated for use  
25 in said front end unit.

26

27 5. A front end unit according to any preceding claim,  
28 wherein said modem means is dedicated for use in said  
29 front end unit.

30

31 6. A front end unit according to any preceding claim,  
32 wherein the camera means comprises a video camera.

33

34 7. A front end unit according to any preceding claim,  
35 wherein the front end unit includes data compression  
36 means.



- 1     8.    A front end unit according to any preceding claim,  
2       wherein the modem means comprises a modem for use with  
3       ISDN, PSTN or network telecommunications systems.  
4
- 5     9.    A front end unit according to any preceding claim,  
6       further including a transmitter for connection to a  
7       cellular telephone system or other wireless telegraphy  
8       system.  
9
- 10    10.   A front end unit according to any preceding claim,  
11       wherein the data processing means includes a frame  
12       grabber.  
13
- 14    11.   A front end unit according to any preceding claim,  
15       wherein the housing is not greater than about 15cm by  
16       15cm by 25cm in size.  
17
- 18    12.   A front end unit according to any preceding claim,  
19       including two spaced apart camera means each adapted to  
20       provide an image from a slightly different view point,  
21       enabling a three dimensional interpretation of the data  
22       provided by said front end unit.  
23
- 24    13.   A front end unit according to any preceding claim,  
25       having input means for receipt of an image signal from  
26       a second or subsequent front end unit, and wherein at  
27       least one of the digitisation means, data processing  
28       means and modem means acts upon the image signal from  
29       the second or subsequent front end unit.  
30
- 31    14.   An imaging system including at least one front end  
32       unit according to any preceding claim.  
33
- 34    15.   An imaging system according to Claim 14, further  
35       including a host unit comprising a computer and a  
36       modem, said host unit being located remote from said

1 front end unit and adapted to communicate with the  
2 front end unit via a telephone connection.  
3

4 16. An imaging system according to Claim 15, wherein  
5 said host unit includes display means and is adapted  
6 for displaying images communicated from the front end  
7 unit.  
8

9 17. An imaging system according to either of Claims 15  
10 or 16, wherein the host unit includes data storage  
11 means for storing data relating to images communicated  
12 from the front end unit.  
13

14 18. An imaging system according to any of Claims 15 to  
15 17, wherein the host unit includes means for  
16 manipulating or analysing images.  
17

18 19. An imaging system according to any of Claims 15 to  
19 18, wherein the host unit includes means for  
20 selectively interrogating one of a number of front end  
21 units by communicating with said selected front end  
22 unit via a corresponding selected telephone connection.  
23

24 20. An imaging system according to any of Claims 15 to  
25 19, wherein the front end unit is adapted to initiate  
26 communication with the host unit in response to a  
27 triggering signal, or alarm signal, generated in  
28 response to a stimulus in the vicinity of the front end  
29 unit.  
30

31 21. An imaging system according to any of Claims 15 to  
32 20, comprising:

33 a first front end unit according to Claim 13;  
34 at least one second or subsequent front end unit,  
35 in the vicinity of the first front end unit, without at  
36 least one of a digitisation means, data processing

1 means or modem means, and wherein the system is adapted  
2 to relay images from the second or subsequent front end  
3 unit to the host unit by utilising the digitisation  
4 means, data processing means and/or modem means of the  
5 first front end unit.  
6

7 22. A method of stock control including:  
8 use of a plurality of spaced apart front end units  
9 according to any of Claims 1 to 13, in order to provide  
10 images from which stock levels in corresponding spaced  
11 apart areas can be determined.  
12

13 23. A method of stock control according to Claim 22,  
14 further comprising use of a remote host unit to  
15 selectively interrogate a first one of said plurality  
16 of front end units and to receive one or more images  
17 from said selected front end unit from which the stock  
18 level at the corresponding area may be determined.  
19

20 24. A method of stock control according to Claim 23,  
21 further comprising using the host unit to subsequently  
22 interrogate a second one of said plurality of front end  
23 units and to receive one or more images therefrom.  
24

25 25. A method of stock control according to either of  
26 Claims 23 or 24, wherein the host unit runs stock  
27 control/ordering software simultaneously with software  
28 enabling the interrogation of the front end units and  
29 interpretation of data received from said front end  
30 units.  
31

32 26. A method of stock control according to any of  
33 Claims 23 to 25, wherein the use of the host unit to  
34 interrogate a selected front end unit comprises the  
35 host unit initiating connection to the front end unit  
36 by selection of a telephone connection which

1 corresponds to the selected front end unit.

2

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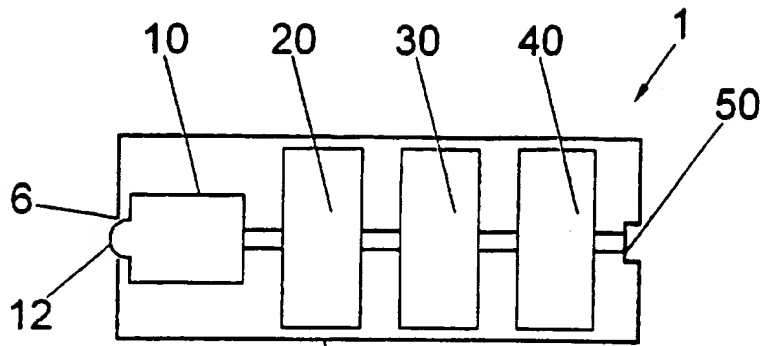


Fig. 1a

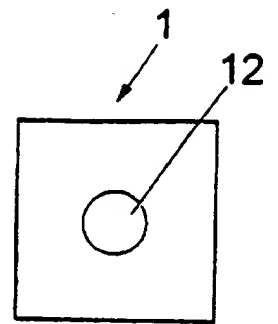


Fig. 1b

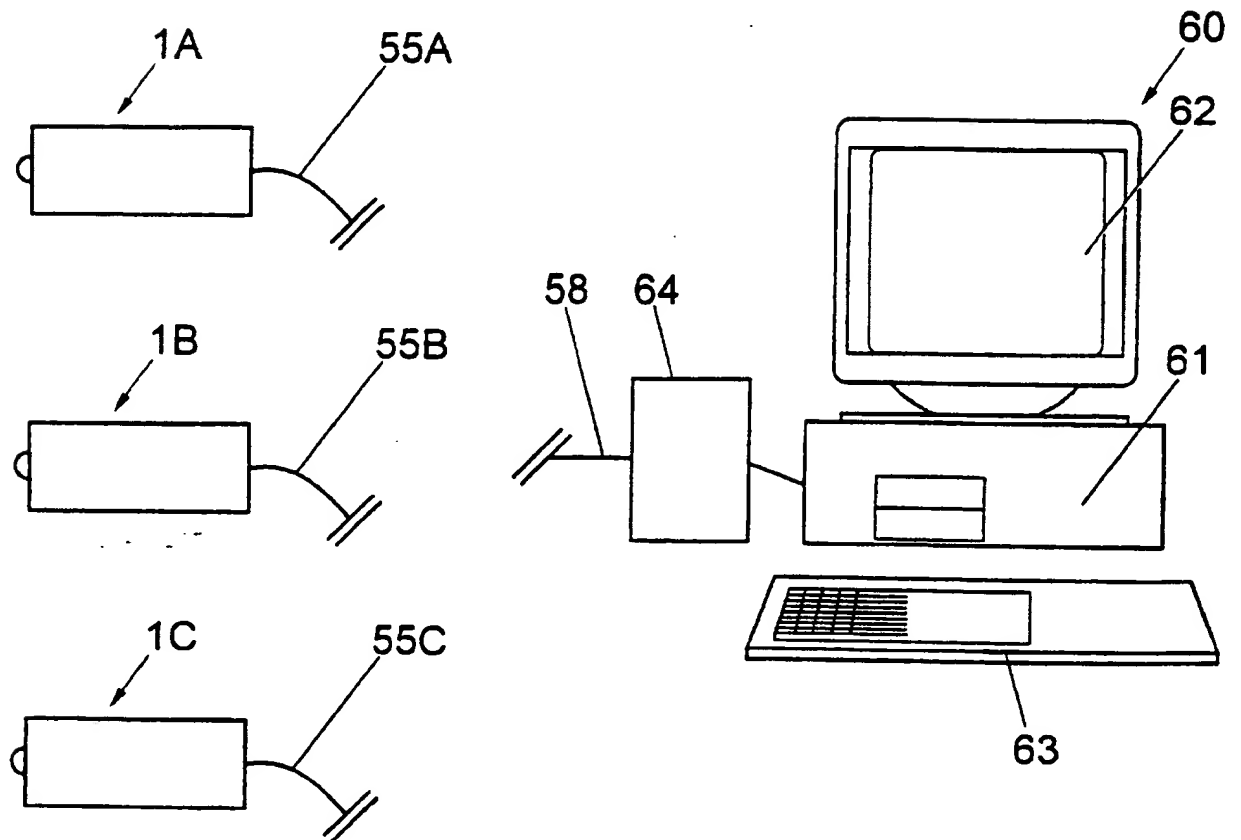


Fig. 2

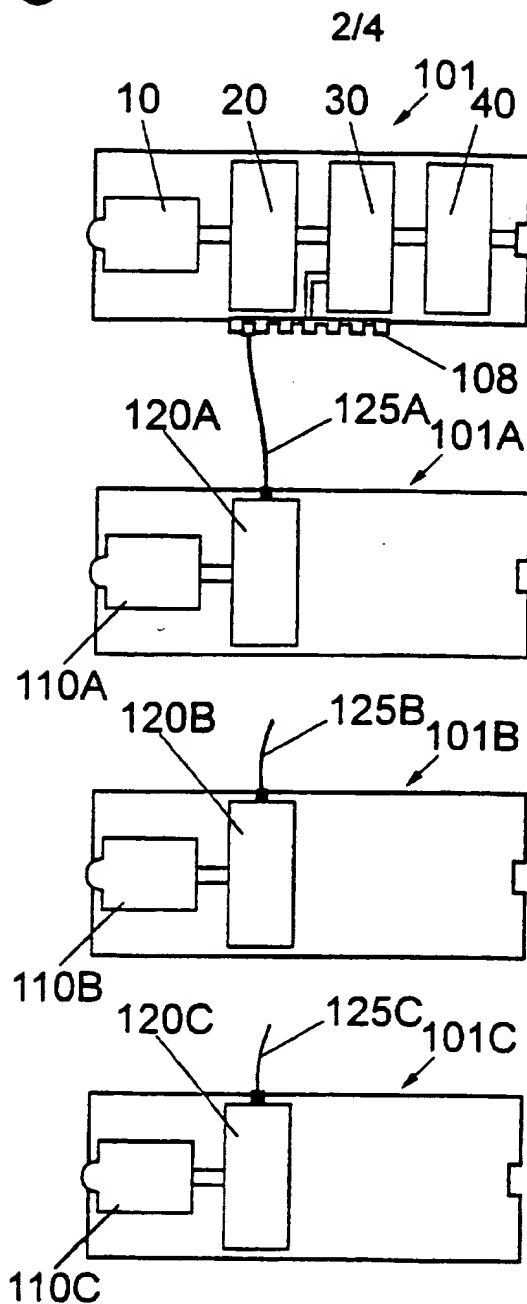
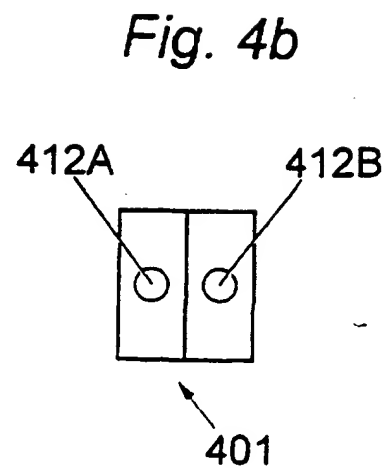
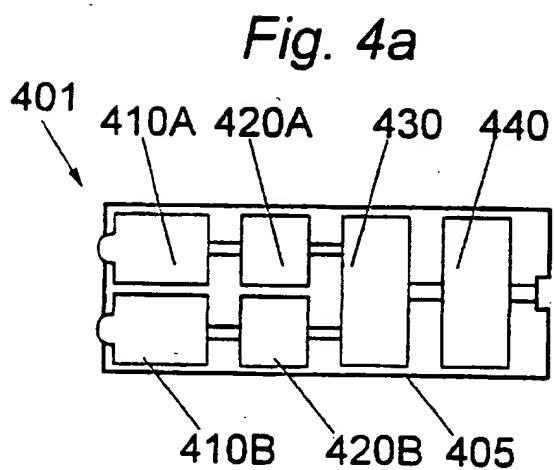


Fig. 3



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Fig. 5

## TECHNICAL SPECIFICATION

<b>CAMERA MODULE</b> Sensor Type Image Sensor Area Resolution	Colour CCD Total Pixel Effective Pixel Horizontal Vertical	795(H) x 596(V) 792(H) x 582(V) 470TV Lines 580TV Lines
<b>VIDEO CAPTURE MODULE</b> Resolution Video Inputs  Video Output Format Video Memory	Six analogue inputs (six times CVBS or three times Y/C, or combinations)	768(H) x 576(V)  4:2:2 YUV, 16 Bit 512K x 16 Bits
<b>CONTROLLER MODULE</b> CPU Program Memory System RAM Watchdog Timer  Serial Interface Parallel Interface Real Time Clock  Power Management	Am188EM Flash Memory SRAM within the Am188EM Automatically resets the microcontroller CPU in case of hang up For test and Diagnostics Four inputs, four Outputs Date and Time information managed through a RTC device connected to a rechargeable lithium battery. RAM within the device to reduce power consumption, a sleep module is provided which turns off power to the Camera and Video Capture Modules. When sleep mode is active, power is automatically switched to the Camera Video Capture Modules on receipt of an incoming call or a change in condition of one of the parallel inputs.	8-bit controller 512 x 8-bits 128 x 8-bits
<b>COMMUNICATION MODULE</b> ISDN  PSTN/PCMCIA module available Network/PCMCIA module available	ISDN 2 DSSI European Standard Protocol	128 Kbits/sec
<b>POWER SUPPLY</b> Supply Type Outputs Provided Maximum Load	Switched Mode +5v, +12V, -12V 20 Watts	
<b>SYSTEM DETAILS</b> Power Requirements Power Consumption	120 V ac or 240 V ac Approximately 12 Watts maximum	
<b>EXTERNAL CONNECTIONS</b> ISDN Serial/Parallel External Video	RJ45 Socket 25 Pin D-Type Connector 75R BNC	

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Fig. 6

## TECHNICAL SPECIFICATION

<b>CAMERA MODULE</b> Sensor Type Image Sensor Area Resolution Lens Type	Colour CCD Total Pixel Effective Pixel Horizontal Vertical Integrated 4mm lens	795(H) x 596(V) 752(H) x 582(V) 470TV Lines 580TV Lines
<b>VIDEO CAPTURE MODULE</b> Resolution Video Inputs Video Output Format Video Memory	Six analogue inputs (six times CVBS or three times Y/C, or combinations)	768(H) x 576(V) 4:2:2 YUV, 16 Bit 512K x 16 Bits
<b>CONTROLLER MODULE</b> CPU Program Memory System RAM Image Storage Watchdog Timer Serial Interface Parallel Interface Real Time Clock	32 bit Processor DRAM DRAM Hard Disk Automatically resets the CPU in case of hang up For test and Diagnostics Four inputs, four Outputs Date and Time Information	486 DX 4 M Bytes 4 M Bytes 1 GB, 4 GB
<b>COMMUNICATION MODULE</b> ISDN PSTN/PCMCIA module Network module available	ISDN 2 DSSI European Standard Protocol	128 Kbits/sec 33.6 Kbits/sec Handset dependent
<b>POWER SUPPLY</b> Supply Type Outputs Provided Maximum Load	Switched Mode +5v, +12V, -12V 20 Watts	
<b>SYSTEM DETAILS</b> Power Requirements Power Consumption	120 V ac or 240 V ac Approximately 12 Watts maximum	
<b>EXTERNAL CONNECTIONS</b> ISDN Parallel Serial External Video	RJ45 Socket 25 Pin D-Type Connector 9 Pin D-Type Connector 15 pin D-Type Connector	



## INTERNATIONAL SEARCH REPORT

Internat Application No  
PC B 97/01042A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 H04N7/14

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 274 044 A (CHATER JOHN CHARLES ;CHATER IAN (GB); CHATER GUY (GB)) 6 July 1994 see page 7, line 11 - page 9, line 3 see figures 1-9 ---	1,3-8, 13-19, 21-26
X	NTT REVIEW, vol. 6, no. 4, 1 July 1994, pages 70-78, XP000460340 HIROYUKI MATSUI ET AL: "AN ISDN BASIC INTERFACE VIDEOPHONE" see the whole document ---	1-8,10, 11,13, 14,22
X	EP 0 500 091 A (HITACHI LTD) 26 August 1992 see page 7, column 10, line 10 - page 12, column 19, line 46 see figures 1-13 -----	1-8, 12-14

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

31 July 1997

Date of mailing of the international search report

07.08.97

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Van der Zaal, R

# INTERNATIONAL SEARCH REPORT

Informative patent family members

Internal Application No

PCT/97/01042

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2274044 A	06-07-94	AU 6112894 A	14-09-94
		CA 2157036 A	01-09-94
		CN 1118646 A	13-03-96
		EP 0686335 A	13-12-95
		WO 9419907 A	01-09-94
		HK 154496 A	23-08-96
		JP 8510099 T	22-10-96
		US 5598351 A	28-01-97
-----			
EP 0500091 A	26-08-92	JP 4265086 A	21-09-92
		US 5396269 A	07-03-95
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